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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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O'MALLEY AND FIRESTONE
919 SOUTH HARRISON STREET
SUITE 210
FORT WAYNE, IN 46802

EXAMINER

KURR, JASON RICHARD

ART UNIT PAPER NUMBER

2615

DATE MAILED: 12/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/649,040

Applicant(s)

GRABER, CURTIS E.

Examiner

Jason R. Kurr

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 August 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 8/27/03.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 10-12 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Danley (US 4,845,759).

With respect to claim 1, Danley discloses a loudspeaker comprising: an enclosure including a folded horn having a mouth (fig.4 #48); a plurality of acoustic transducers housed in the enclosure (fig.6 #40,42,44); a throat (fig.6 #46) associated with each transducer for coupling the output of the transducer into the folded horn; and throat outlets being differentially spaced from the mouth (fig.2, col.2 ln.59-66).

With respect to claim 2, Danley discloses a loudspeaker as set forth in claim 1, further comprising: a source of an acoustic range signal (fig.3 "AMP"); and transducer drive signal processing circuitry (fig.6 #60) having an individual channel for each of the audio transducers, the individual channels each being coupled to receive the acoustic range signal and each channel including a time delay element (fig.3 #32) for delaying a signal in a channel as a function of the distance of the throat for the audio transducer associated with the channel from the mouth of the folded horn (col.2 ln.67-68, col.3 ln.1-15).

With respect to claim 3, Danley discloses a loudspeaker as set forth in claim 2, further comprising: a plurality of high pressure chambers (fig.6 #46), at least one acoustic transducer being positioned to direct sound energy into each high pressure chamber, each high pressure chamber further having an elongated port to the folded horn providing a throat for the high pressure chamber (fig.6).

With respect to claim 10, Danley discloses an apparatus comprising: a plurality of acoustic transducers (fig.2 #20) including at least two substantially identical acoustic transducers; a plurality of high pressure chambers (fig.6 #46) with an acoustic transducer associated with each high pressure chamber, including two high pressure chambers of substantially the same volume into which the output of one each of the two substantially identical acoustic transducers is directed (fig.6); an extended acoustic port from each high pressure chamber (fig.6 #46); and a horn having a summing section connected to a radiating end of each extended acoustic port and a mouth (fig.4 #48, col.3 ln.35-46), the radiating ends of the extended acoustic ports associated with the two high pressure chambers of substantially the same volume being differentially spaced in terms of acoustic propagation time from the mouth (fig.2, col.2 ln.63-66).

With respect to claim 11, Danley discloses the apparatus as claimed in claim 10, further comprising: means (fig.3 #32) for coordinating operation of the two substantially identical acoustic transducers so that the pressure waves from the radiating ends of the acoustic ports reinforce one another (col.2 ln.67-68, col.3 ln.1-15).

With respect to claim 12, Danley discloses the apparatus as claimed in claim 11, wherein the acoustic transducers are aligned side by side (fig.6).

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With respect to claim 14, Danley discloses the apparatus as claimed in claim 11, the means for coordinating further comprising drive circuitry for the substantially identical acoustic transducers including delay means (fig.3 #32) for synchronizing the pressure waves upon their meeting in the summing section (col.1 ln.42-48).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4, 5, 9 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Danley (US 4,845,759) in view of Ohta (US 2001/0016045 A1).

With respect to claim 4, Danley discloses a loudspeaker as set forth in claim 3, however does not disclose expressly wherein each channel of the transducer drive signal processing circuitry further comprising: a band pass filter receiving the acoustic range signal and producing a filtered signal therefrom; the time delay element receiving filtered signal and producing a delayed, filtered signal; and a dynamic phase adjustment element receiving the delayed, filtered signal and adjusting the phase of the signal as a function of frequency to produce a drive signal for an acoustic transducer.

Ohta discloses a system for correcting a sound field in an audio system wherein a plurality of channels of a transducer drive processing circuitry (fig.2 #2) connected to respective speakers each comprise: a band pass filter (fig.2 "BPF 2-5") receiving an

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acoustic range signal (fig.2 #3) and producing a filtered signal therefrom, and a dynamic phase adjustment element (fig.2 "Delay Circuit") receiving the filtered signal and adjusting the phase of the signal as a function of frequency to produce a drive signal for an acoustic transducer (pg.4 [0055]).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the sound field correcting system of Ohta in the invention of Danley. The output of the band pass filter of Ohta would have supplied a filtered signal for the delay means of Danley, still allowing for adjustment in the dispersion pattern of the disclosed horn. Providing the additional phase adjustment element of Ohta would have allowed for the invention of Danley to compensate for various acoustic environments.

The motivation for using the sound field correcting features of Ohta in the invention of Danley would have been to allow the system to correct sound field anomalies resulting from imperfect acoustic environments, more specifically frequency and delay characteristics. This would provide a listener within the environment a more realistic reproduced sound, absent of distortions resulted from the acoustic environment.

With respect to claim 5, Danley discloses a loudspeaker as set forth in claim 4, further comprising: a summing section of the folded horn into which each throat is coupled (col.3 ln.35-46).

With respect to claim 9, Danley discloses a loudspeaker as set forth in claim 4 in view of Ohta, wherein the band pass filters, delay elements and dynamic phase

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adjustment elements are realized in a digital signal processor (Danley: col.3 ln.7-10)(Ohta: fig.2 #2, pg.3 [0036]).

With respect to claim 15, Danley discloses the apparatus as claimed in claim 14, however does not disclose expressly wherein the drive circuitry includes a pass band filter associated with each of the substantially identical transducers and a dynamic phase adjustment element for each of the substantially identical acoustic transducers.

Ohta discloses a system for correcting a sound field in an audio system wherein a plurality of channels of a transducer drive processing circuitry (fig.2 #2) connected to respective speakers each comprise: a band pass filter (fig.2 "BPF 2-5") receiving an acoustic range signal (fig.2 #3) and producing a filtered signal therefrom, and a dynamic phase adjustment element (fig.2 "Delay Circuit") receiving the filtered signal and adjusting the phase of the signal as a function of frequency to produce a drive signal for an acoustic transducer (pg.4 [0055]).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the sound field correcting system of Ohta in the invention of Danley. The output of the band pass filter of Ohta would have supplied a filtered signal for the delay means of Danley, still allowing for adjustment in the dispersion pattern of the disclosed horn. Providing the additional phase adjustment element of Ohta would have allowed for the invention of Danley to compensate for various acoustic environments.

The motivation for using the sound field correcting features of Ohta in the invention of Danley would have been to allow the system to correct sound field

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anomalies resulting from imperfect acoustic environments, more specifically frequency and delay characteristics. This would provide a listener within the environment a more realistic reproduced sound, absent of distortions resulted from the acoustic environment.

Claims 6-8 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Danley (US 4,845,759) "Danley1", in view of Danley et al (US 6,411,718 B1) "Danley2".

With respect to claim 6, Danley1 discloses a loudspeaker as set forth in claim 5, further comprising: the acoustic transducers having a small vibrational surface area relative to the predominant range of frequencies to be reproduced (fig.6 #40,42,44); however does not disclose expressly wherein the loudspeaker further comprises a plurality of sealed back chambers, one sealed back chamber housing each acoustic transducer.

Danley2 discloses a loudspeaker wherein the loudspeaker further comprises a plurality of sealed back chambers (fig.2C "not labeled"), one sealed back chamber housing each acoustic transducer (fig.2C #50,52,46,48).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the sealed back chambers of Danley2 on the transducers of Danley1.

The motivation for doing so would have been to protect the drivers of the transducers from being damaged from external foreign objects.

With respect to claim 7, Danley1 discloses a loudspeaker as set forth in claim 6, further comprising: the audio transducers being positioned with respect to one another in a linear array, one to each high pressure chamber (fig.6).

With respect to claim 8, Danley1 discloses a loudspeaker as set forth in claim 6, further comprising: a plurality of acoustic transducers (fig.6 #40,42,44) coupled to each high pressure chamber (fig.6 #46).

With respect to claim 13, Danley1 discloses the apparatus as claimed in claim 11, however does not disclose expressly wherein the acoustic transducers are housed in sealed back chambers.

Danley2 discloses an apparatus wherein the acoustic transducers (fig.2C #50,52,46,48) are housed in sealed back chambers (fig.2C "not labeled").

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the sealed back chambers of Danley2 on the transducers of Danley1.

The motivation for doing so would have been to protect the drivers of the transducers from being damaged from external foreign objects.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lyons et al (US 5,397,866) discloses a dual acoustic horn assembly.

Thomas et al (US 4,227,051) discloses a loudspeaker and enclosure system.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason R. Kurr whose telephone number is (571) 272-0552. The examiner can normally be reached on M-F 10:00am to 6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571) 273-8300. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JK
JK


VIVIAN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600